OPERATION MANUAL

1. SUMMARIZE

The meter is a stable multimeter with 40mm LCD display, driven by battery. It's widely used on measuring DCV, ACV, DCA, ACA, resistance, capacitance, diode, transistor, continuity test ,temperature auto power off /on and LCD back – light . It's an ideal tool for lab, factory and family.

2. SAFETY NOTE

The meter meets the standards of IEC1010. Read the operation manual carefully before operation.

1. Do not input limit over-ranged.
2. The voltage below 36V is safety. To avoid electric shock, check whether the test leads are connected correctly, whether the insulation is good when measuring over 36DCV or 25ACV.
3. Remove the test leads when changing function and range.
4. To select correct function and range, beware of error operation.;
5. Do not operate the meter if battery case and back cover is not fixed.
6. Do not input voltage when measuring resistance.
7. Remove test leads from test point and turn off the power before replacing battery and fuse.
8. SAFETY SYMBOLS

"⚠" EXISTS DANGEROUS VOLTAGE, "⏚" GND, "⧈" DUAL INSULATION

"⚠" THE OPERATOR MUST REFER TO THE MANUAL , "🔋" LOW BATTERY

3. CHARACTERISTIC

1. GENERAL

1-1. Display :LCD displaying.

1-2. Max. displaying: 1999（3 1/2digit）auto polarity indication.

1-3. Measuring method: dual slope A/D conversion.

1-4. Operation uninterruptable power.

1-5. Using panel testing technology

1-6. Sampling rate: approx. 3 times/second.

1-7. Over range indication: the MSD displays "OL".

1-8. Low battery indication: "🔋" appears.

1-9. Operation environment: （0~40）℃, R.H.<80% .

1-10. Power：9V×1（NEDA1604/6F22 or equivalent model）.

1-11. Size: 175×93×55mm

1-12. Weight: approx. 400g（including battery）.

1-13.Accessories:operation manual ,holster, gift box, 20A test leads, K type thermocouple TP01 and 9V battery.

2. TECHNICAL CHARACTERISTIC

2-1. Accuracy:±(a%×rdg+d) at (23±5)℃, R.H.<75%, one year guaranteed from the production date.

2-2. TECHNICAL DATA

2-2-1. DCV

RANGE	ACCURACY	RESOLUTION
200mV	±(0.5%+3)	100uV
2V		1mV
20V	±(0.5%+3)	10mV
200V	±(0.5%+3)	100mV
1000V	±(0.8%+10)	1V

Input resistance: 5MΩ at mV range , other ranges: 10 MΩ

Overload protection: 250V DV or AC peak value at 200mV range.

1000V DC or AC peak value at other ranges.

2-2-2. ACV TRUE RMS

RANGE	ACCURACY	RESOLUTION
2V	±(0.8%+5)	1mV
20V		10mV
200V		100mV
750V	±(1.2%+10)	1V

Input resistance: 10MΩ

Overload protection: 1000V DC or AC peak value

Frequency response :（40～1000）Hz （for standard sine wave and triangular wave）

Display: True RMS (just for reference when over 200Hz at other waves.)

In AC750V range, you can test AC380V and AC220V commercial power after press the "HOLD"key.

2-2-3.DCA

RANGE	ACCURACY	RESOLUTION
200uA	±(0.8%+10)	0.1uA
2mA		1uA
20mA		10uA
200mA	±(1.2%+8)	100uA
20A	±(2.0%+5)	10mA

Max. input volt drop: 200mV;

Max. input current: 20A（the test time should be within 10 seconds）

Overload protection: 0.2A/250V；20A/250V fast-melt fuse

2-2-4.ACA

RANGE	ACCURACY	RESOLUTION
20mA	±(1.0%+15)	10uA
200mA	±(2.0%+5)	100uA
20A	±(3.0%+10)	10mA

Max. measuring volt drop: 200mV

Max. input current: 20A（the test time should be within 10 seconds）

Overload protection: 0.2A/250V；20A/250V fast-blown fuse

Frequency response: （40～1000）Hz （for standard sine wave and triangular wave）

Display: True RMS (just for reference when over 200Hz at other waves.)

2-2-5. RESISTANCE（Ω）

RANGE	ACCURACY	RESOLUTION
200Ω	±(0.8%+5)	0.1Ω
2kΩ	±(0.8%+3)	1Ω
20kΩ		10Ω
200kΩ		100Ω
2MΩ	±(0.8%+3)	1kΩ
20MΩ	±(1.0%+25)	10kΩ

Open voltage: less than 0.7V

Overload protection: 250V DC and AC peak value

NOTE: at 200Ω range, the test leads should be short-circuit, and measure the down-lead resistance, then, subtract from the real measuring.

WARNING: DO NOT input any voltage at resistance range for safety!

2-2-6. CAPACITANCE (C)

RANGE	ACCURACY	RESOLUTION
2nF	±(5.0%+40)	1pF
20nF	±(2.5%+20)	10pF/100pF
200nF		10pF/100pF
2uF/20uF/200uF		100nF
2000uF	±(5.0%+10)	1uF
20mF		10uF

Overload protection: 36V DC or AC peak value

2-2-7.DIODE AND CONTINUITY TEST

Range	Displaying value	Test condition
⊣◀ 🔊	Positive voltage drop of diode	The positive DC current is approx. 1mA , negative voltage is approx. 3V
	Buzzer sounds , the resistance is less than 30Ω	open voltage is approx. 3V

Overload protection: 250V DC or AC peak value

Warning: DO NOT input any voltage at this range for safety!

2-2-8. Triode hFE test

Range	Display range	Test condition
hFE NPN or PNP	0～1000	Basic current is approx.10uA,Vce is approx.3V

2-2-9. .TEMPERATURE(℃)

Range \ Accuracy	Accuracy	Resolution
(-20～1000)℃	＜ 400℃±(1.0%+5) ≥ 400℃±(1.5%+15)	1℃

Sensor: K-type thermocouple with banana plug

4. OPERATION

4.1 Front panel description

1. Model
2. LCD: display the measured value .
3. Shine diode: the alert for continuity testing.
4 .range knob: selecting measuring function , range and power on/off.
5 .20A current test jack
6. "+" pole jack of testing 200mA current.
7. "—" pole of capacitance. and GND.
8. "+" pole jack of volt, resistance and diode.
9. Transistor test jack : transistor testing input terminal.
10. LCD backlight/automatic shutdown switch

See the fig.

4.2 DCV MEASUREMENT

1.Insert the black test lead to “COM” jack, the red one to V/Ω jack.

2.Set the range knob to a proper DCV range, connect the test leads across to the circuit under tested, the polarity and voltage of the point which red lead connect will display on LCD.

NOTE:

1.If the measured voltage is unsure beforehand, should set the range knob to the highest range, then, switch to a proper range according to the displayed value.

2.If LCD displays “OL”, it means over range, should set the range knob to a higher range.

4.3 ACV True RMS MEASUREMENT

1.Insert the black test lead to “COM” jack, the red one to V/Ω jack.

2. Set the range knob to a proper ACV range, connect the test leads across to the circuit under tested.

NOTE:

1.If the measured voltage is unsure beforehand, should set the range knob to the highest range, then, switch to a proper range according to the displayed value.

2.If LCD displays “OL”, it means over range, should set the range knob to a higher range.

4.4 DCA MEASUREMENT

1.Insert the black test lead to “COM” jack and the red one to “mA” jack（max. 200mA）, or insert the red one to “20A” jack（max. 20A）.

2.Set the range knob to a proper DCA range, connect the test leads across to the circuit under tested, the current value and polarity of the point which red lead connect will display on LCD.

NOTE:

1.If the measured current is unsure beforehand, should set the range knob to a higher range, then, switch to a proper range according to the displayed value.

2.If LCD displays “OL” , it means overrange, should set the range knob to a higher range.

3. When measuring 20A.. Continuously measuring large current may heat the circuit, affect the accuracy, eve damage the meter.

4.5 ACV MEASUREMENT

1.Insert the black test lead to “COM” jack and the red one to “mA” jack（max. 200mA）, or insert the red one to “20A” jack（max. 20A）.

2.Set the range knob to a proper ACA range; connect the test leads across to the circuit under tested.

NOTE:

1.If the measured current range is unsure beforehand, should set the range knob to the highest range, then set to a proper range according to the displayed value.

2.If LCD displays “OL” , it means overrange, should set the range knob to a higher range.

3. Pay attention to measure 20A.. Continuously measuring large current may heat the circuit, affect the accuracy, eve damage the meter.

4.6 RESISTANCE MEASUREMENT

1.Insert the black test lead to “COM” jack and the red one to “V/Ω” jack.

2.Set the range knob to a proper resistance range, connect the test leads across to the resistance under measured.

NOTE:

1.If the resistance value being measured exceeds the max value of the range selected, LCD displays "OL", thus, should set the range knob to a higher range. When the resistance is over 1MΩ, the meter may take a few seconds to stabilize. This is normal for high resistance readings.

2.When input terminal is in open circuit, overload displays.

3.When measuring in-line resistance, be sure that power is off and all capacitors are released completely.

4.7 CAPACITANCE MEASUREMENT

1.Insert the red test lead to “V/Ω” terminal and the black one to “COM” jack.

2.Set the range knob to a proper capacitance range, connect the test leads to the capacitor under measured（note: the polarity of red test lead is “+”）.

NOTE:

1.If the capacitance range under measured is unsure beforehand, should set the range knob to the highest range, then, set to a proper range according to the displayed value.

2.If LCD displays “OL” , it means over range, should set the range knob to a higher range.

3.Before measuring, LCD display might not be zero, the residual reading will be decreased gradually and could be disregarded.

4.When measuring large capacitance, if creeps seriously or break capacitance, LCD will display some instability value.

5.Discharge all capacitors completely before capacitance measurement to avoid damage.

6.UNIT: 1uF =1000nF 1nF=1000pF

4.8 DIODE AND CONTINUITY TEST

1.Insert the black test lead to “COM” terminal and the red one to V/Ω jack(Note: the polarity of red test lead is “+”).

2. Set the range knob to “ ” range, connect the test leads to the diode under measured, reading is the approximation of the diode positive volt drop.

3.Connect the test leads to two points of the measured circuit, if buzzer sounds, the resistance is lower than approx.30Ω.

4.9 TRIODE hFE

1.Set the range knob to hFE.

2.Verify the type of the transistor is NPN or PNP, insert the emitter, basic and collector to the proper jack on test accessory.

4.10 AUTO POWER-OFF AND LCD BACKLIGHT ON

After power on ,LCD displays “APO” ,mean the meter is in automatic power off mode , With rotate the knob in 15 minites and the figure changing , The meter is in nonautomatic power off mode .Press “HOLD” key to power on the meter , when “APO” isn’t showing on LCD ,the meter is in nonautomatic power off mode .Shortly press “HOLD” key to turn on/off the “HOLD” function , Long press “HOLD ” key to turn on/off the backlight .

4.11 TEMPERATURE MEASUREMENT

Insert the cathode of thermocouple’s cold end to “ COM” jack and anode to “V/Ω” terminal, put the working end on or in the tested object, temperature value can be read on LCD in Celsius.

5.MAINTENANCE

DO NOT try to verify the circuit for it’s a precision meter.

1.Beware of waterproof, dustproof and shockproof.

2.Do not operate and store the meter in the circumstance of high temperature, high humidity, and flammability, explosive and strong magnetic field.

3.Use the damp cloth and soft solvent to clean the meter, do not use abrasive and alcohol.

4.If do not operate it for a long time, should take out the battery.

4-1.When LCD displays “ ” symbol, should replace the battery as below:

4-1-1.Take out the holster and drop out the battery case.

4-1-2.Take out the battery and replace a new one. It’s better to use alkalescence battery for long time use.

4-1-3.Fix the battery case and take on the holster.

6. If the meter does not work properly, check the meter as following:

CONDITIONS	WAY TO SOLVE
NO DISPLAYING	●Power is off ●Replace battery
symbol displays	●Replace battery
NO CURRENT INPUT	●Replace fuse
BIG ERROR	●Replace battery